Low-Temperature Incubator

Operating manual and applicable equipment

S-LIB series

Check	Details
Controller	TC2
Operating temperature	-5 to 60°C
About this edition	English translation and re-edited version of the supplied Korean operating manual. Match it to the equipment nameplate, controller and supplied configuration before use.

Photographs are representative examples. Appearance and controls can vary with manufacturing date or custom configuration. Do not apply these instructions to a different controller.

Contents: applicable model / safety and installation / equipment and operation / controller / maintenance and faults / warranty and GHT support.

Safety precautions

Read this manual and your facility procedures before use. Only authorised, trained personnel may operate the equipment. DANGER, WARNING and CAUTION identify precautions against electric shock, fire, explosion, burns and equipment damage.

Hazard	Required precautions
DANGER	Do not place explosive or flammable substances in the chamber. Do not install near ignition sources or where combustible gas or organic-solvent vapour may be present.
WARNING: electricity	Use a correctly rated, earthed supply matching the nameplate. Avoid overloaded multi-outlet connections. Never operate electrical parts with wet hands. Do not earth to gas pipes, plastic water pipes or telephone lines.
WARNING: heat	The chamber, door and exhaust become hot. Allow adequate cooling before opening or unloading. Use protective equipment suited to the temperature and task.
WARNING: service	Only qualified service technicians may dismantle, modify or inspect internal parts. Stop operation, cool the equipment and isolate the supply before cleaning, maintenance or moving.
Abnormal operation	If there is unusual noise, odour, smoke, leakage current or other abnormal behaviour, stop use, make the area safe, isolate the supply and contact GHT.

Do not wash by spraying water. Keep ventilation openings clear. Avoid moisture, dust, corrosive gases, direct sunlight, rain and external heat sources. Install indoors on a firm, level surface. Do not tilt, lay down or strike the equipment during transport.

Configuration and operating range

This forced-circulation incubator maintains temperature for microbiological and other incubation work. A fan circulates chamber air; the inner glass door reduces temperature disturbance during observation. A top-mounted TC2 provides control.

S-LIB supports low-temperature incubation and BOD work within -5 to 60°C.

Component	Function
Glass inner door	Observation with reduced disturbance when the outer door is opened.
Wire shelves	Support samples without blocking circulation.
TC2	Temperature, timer and PID settings.
Vent Hole	Ventilation opening; follow the actual configuration and test requirements.
Protection / breaker	Over-temperature, leakage and overcurrent protection.

After powering on, check the standby display and settings and stay within the operating range. Minimise door opening and follow your facility procedures for handling the culture material.

TC2: display and keys

TC2 displays the measured value and setpoint and sets temperature, time and PID control. The source describes PID settings for lower and higher temperatures; the normally unused ramp function is hidden.

Display / key	Function
Upper / lower display	Upper: measured temperature or parameter. Lower: setpoint or setting.
ON / OFF	Starts or stops output. Hold for about 3 seconds.
MODE	Selects TEMP, TIME, BEEP and other items and saves settings. Hold for about 3 seconds to enter/leave setting mode.
Digit / increase keys	Select a digit with the left/right keys and change its value with the increase key.
A/T	Starts/cancels auto tuning. A short press changes output or remaining-time displays.
Indicators	ON: running; HEATER: heating output; TIME: timer; A/T: automatic tuning.

TC2: settings, running and stopping

After main power is turned ON, the controller is in standby. Set temperature and time, exit the setting display, then hold ON/OFF for about 3 seconds to run.

Use MODE to move through TEMP, TIME and BEEP. Change values with the digit and increase keys and save. Hold MODE for about 3 seconds to return to the initial display.

TIME uses 00.00 for hours/minutes. Counting starts after reaching the set temperature. TIME flashes while waiting and stays lit while counting. On completion, END appears and output stops.

BEEP is initially 30 seconds and can be set up to 9999 seconds. Check the actual display and setting range.

During operation, hold ON/OFF for about 3 seconds to pause; hold again for about 3 seconds to restart. A short press of A/T accesses output or remaining timer information.

Continuous operation at TIME = 00.00 is expressly described in the muffle-furnace and industrial-vacuum-oven source manuals. Do not assume the same behaviour for other equipment without checking its actual configuration.

IMPORTANT: the supplied incubator manuals contain a generic 120°C example, but these incubators have a 60°C upper operating limit. Do not use that example as an operating condition.

TC2: auto tuning

Set the required temperature, start output and hold A/T for about 6 seconds. The A/T indicator flashes, then goes out when tuning finishes. Operation continues at the setpoint.

Tuning cycles the temperature up and down. The source gives approximately three cycles and a condition-dependent duration of 2 to 6 hours. Assess the effect of temperature excursions before tuning with a sensitive sample.

If stopped partway through, tuning data are not saved and tuning must be repeated. Factory tuning is provided; it is not necessary to tune on every run if temperature is stable.

The source contains generic factory tuning temperatures of 40°C and 120°C. These do not apply to every model. Never tune above the equipment operating limit.

If temperature does not rise, check the over-temperature setting and operating state. Contact GHT if the issue remains unresolved.

Maintenance, faults and warranty

Stop, cool and isolate the supply before wiping with a soft cloth. Use only cleaning agents compatible with the materials; keep water and solvents out of electrical parts. Contact GHT for appropriate genuine or specified replacement parts.

If there is no power, check the external supply, plug and main breaker. Internal wiring, fuse, SSR and heater checks must be performed by a qualified technician with safe supply isolation. Users must not remove covers for live inspection.

If temperature does not rise, check the setpoint, operating state, over-temperature setting and heater indicator. Some source instructions mention setting protection at least 20% above the test temperature. Do not exceed the equipment or sample limit; ask GHT to confirm the correct setting.

For storage, clean and dry, unplug and protect against foreign matter. Close the oven vent when stored unused. Drain water-based equipment.

Warranty: the source manuals state one year from purchase or delivery. Confirm the applicable period, start date, transport charges and other terms in the GHT quotation/supply documents. Disaster, fire, flooding, unsuitable environments, misuse and unauthorised dismantling/modification are excluded. Humidity-chamber heaters are excluded as consumables in the source.

Contact GHT

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Provide the model, serial number, delivery date, operating conditions, symptoms and photographs.